

Relative Combat Power Assessment User's Guide



MAGTF Staff Training Program
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Relative Combat Power Assessment User's Guide

This pamphlet supports the academic curricula of the Marine Air Ground Task Force Staff Training Program (MSTP).

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FOREWORD

1. PURPOSE. The *Relative Combat Power Assessment User's Guide* is intended for use by Marine expeditionary force (MEF) and major subordinate command operational planning teams (OPTs) as they participate in the course of action (COA) development process. It is designed to be a user's manual for the stand-alone relative combat power assessment (RCPA) tool.

2. SCOPE. This pamphlet covers the development of a numerical ratio for RCPA. It does not consider morale, level of training, cultural orientation, or command and control of units. Combat potential weights are based on historical minimum planning ratios and multiple sources.

3. SUPERSESSION. None.

4. CHANGES. Recommendations for improvements to this pamphlet are encouraged from commands as well as from individuals. The attached User Suggestion Form can be reproduced and forwarded to:

Commanding General (C 467)
Training and Education Command
3300 Russell Road
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5. CERTIFICATION. Reviewed and approved this date.

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Throughout this pamphlet, masculine nouns and pronouns are used for the sake of simplicity. Except where otherwise noted, these nouns and pronouns apply to either sex.

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Part I

Introduction

While the Marine Corps Planning Process (MCP) requires planners to determine force ratios during course of action (COA) development, assess relative combat power for the COA war game, and make relative combat power evaluations during the COA briefing, it supplies the planner with precious little instruction as to how this is done. The Marine Corps Warfighting Publication (MCWP) 5-1, *Marine Corps Planning Process*, merely notes that the process of determining force ratios require planners to systematically compare the enemy's capabilities against friendly capabilities. The definition of force ratio given in MCWP 5-1 calls for a straight numerical count of like units. Perhaps more revealing, the traditional elements used in measuring combat power are more often expressed in the negative. For example, Marine Air Ground Task Force Staff Training Program (MSTP) Pamphlet 5-0.2, *Operational Planning Team (OPT) Facilitator's Guide*, states, "balance numerical ratios with such things as weather, morale, level of training, and cultural orientation," or Marine Corps Doctrinal Publication (MCDP) 1, *Warfighting*, says, "It is not our intent to try to list or categorize all the various components of combat power, to index their relative values, or to describe their combinations and variations... Nor is it even desirable to be able to do so." This relative combat power assessment (RCPA) tool is one method in an attempt to fill a hole where an essential element was missing in COA development. Without some valid means of measuring relative combat power, who could say if there is sufficient combat power to accomplish the mission, and can it be done without taking excessive casualties. It is only a first step, and this tool should be seen merely as a starting point for further intensive study. The RCPA is but another single tool for the kit bag of the Marine air-ground task force (MAGTF) planner.

The opinions and methodology of this tool are those of MSTP and do not necessarily represent the views of the Marine Corps.

1001. Relative Combat Power Assessment

Relative combat power analysis is a formal element within the COA development step of the MCP. Relative combat power assessment provides planners with an *understanding of friendly and threat force strengths and weaknesses relative to each other*. While force ratios are important, the numerical comparison of personnel and major end items is just one factor that must be balanced with other factors such as weather, morale, level of training, and cultural orientation. The goals of relative combat power assessment are to *identify threat weaknesses that can be exploited through asymmetric application of friendly strengths and identify friendly weaknesses that require protection from threat actions*. This task is difficult, at best. It requires an assessment of both tangible and intangible factors as well as consideration of an inordinate number of those factors either directly or indirectly affecting the potential outcome of the battle.

This step is one of the first conducted as part of COA development. After intelligence preparation of the battlespace (IPB) products are updated and friendly forces are displayed in current and projected locations, an analysis of relative combat powers is conducted. Combat power is the effect created by combining the elements of maneuver, firepower, protection, and leadership in combat against the enemy. The commander integrates and applies the effects of these elements with other potential combat multipliers against the enemy. His goal is to generate overwhelming combat power to accomplish his mission.

By analyzing relative-force ratios and determining and comparing each force's most significant strengths and weaknesses as a function of combat power, the planner can gain some insight into:

- What friendly capabilities pertain to the operation
- What type operations may be possible from both friendly and enemy perspectives
- How and where the enemy may be vulnerable
- What additional resources may be required to execute the mission
- How the unit can disrupt enemy operations to gain or preserve freedom of action and the initiative
- How to allocate existing resources

Planners initially make a rough estimate of force ratios. The RCPA tool can assist to somewhat refine these rough estimates. At the Marine expeditionary force (MEF) and division levels, relative combat power is an evaluation of rough ratios of combat units two levels down. For example, at division level, planners compare all types of combat battalions; at MEF level, they compare friendly regiments versus enemy regiments or brigades. At regiment or battalion levels, they may study, in detail, the personnel or weapons on either side.

The human mind requires some objective basis for making any comparison—even if this takes the form of subject A being “a little bit” superior in one category, while subject B is “significantly” superior in another. Assuming the two categories are equally weighted, “significantly” obviously represents a value greater than “a little bit,” therefore $B > A$. The values may be stated vaguely, and the formula may be rough, but comparisons remain inherently mathematical.

Another area where this is evident is in the wargaming step of the MCPP. Joint Publication 1-02 defines a war game as, “A simulation, by whatever means, of a military operation involving two or more opposing forces, using rules, data, and procedures designed to depict an actual or assumed real life situation.” The implication is that at some point, forces will come into contact and results will have to be adjudicated. In order to do this, some rules, data, and/or procedures will be called into play to determine the outcome. This could entail flipping a coin or rolling a die to randomly determine the winner, but this would likely fail as a simulation. It should probably involve some means of assessing the strength and situation of the opposing sides and applying an outcome with some tie to reality—which will almost certainly involve *historical precedent*. The bottom line is the commander and his staff must show what factors they consider important in determining the outcome of the engagements and must place on them some usable mathematical order. The MCPP handles wargaming by adjudication only. This demonstrates a weakness in how the OPT evaluates relative combat power and assesses the relative strengths, weaknesses, and capabilities of friendly forces to enemy forces. Engagements are decided by majority vote and arbitrary rulings that determine the success or failure of the COA.

Wargaming requires some method of adjudicating combat results. Clearly, combat adjudication—the most difficult problem to understand and codify—will have to be done in a fashion that does not impose an undue time burden on the process. The MCPP, when doing actual force analysis, resolves most of the friendly-enemy interactions during the war game on the basis of the numbers, capabilities, and sustainment of the systems employed in the encounter by both forces, with the Red Cell using the center of gravity (COG)/critical vulnerability (CV) analysis techniques to break the enemy subordinate units into their critical capabilities, requirements, and vulnerabilities. COG/CV analysis is of inestimable value in telling the planner where, when, or what to strike, but they do nothing to reveal who will win a given engagement.

Relative strengths and weaknesses can be further refined by attempting to derive the single greatest strength and weakness of each force, at a minimum, in each of the four dynamics (maneuver, firepower, protection, and leadership) of combat power. By comparing friendly strengths against enemy weaknesses, planners may be able to deduce particular vulnerabilities for each force that may be exploitable or may need to be protected. These deductions may further lead planners to gain insights on potential decision points. For example, historical experience shows that a defender has about 50-50 probability of successfully defeating an attacking force approximately three times his equivalent strength. The defender has many advantages: full use of cover and concealment, selection of the ground on which to fight, weapons sited for maximum effectiveness, choice of firing first, and use of obstacle value of the terrain. Therefore, as a starting point, the commander might use the COA war game and this tool to help determine which avenues of approach need what size/equipped defending force.

A planner first compares the relative force ratios with the ratios in column 2 of Table 1-1. He can then determine if his unit has the odds that would give him the flexibility to conduct any type of operations he desires. The G2/S2/Red Cell will also know if the enemy has that capability. In a defensive situation, the planner would know the enemy must conduct a penetration. In an offensive situation, he would know he couldn't conduct offensive operations without massing his forces and accepting risk in some area. He would be able to use this information when he begins developing a scheme of maneuver. If he identifies a ratio closer to one of the other planning ratios, he could draw other conclusions indicating another type of possible operation. This step provides the planner with a notion of "what to" but not "how to." There is no direct relationship between force ratios and attrition or advance rates. **Relative force ratios do not necessarily indicate the chance for success.**

MSTP is attempting to address the issue of measuring relative combat power with the RCPA tool. Using the RCPA tool, planners can initially make a rough estimate of relative-force ratios. When the staff finishes its computations, it draws conclusions about friendly and enemy relative capabilities and limitations as they pertain to the tactical situation. These computations give the staff a feel for relative strengths and weaknesses, not absolute mathematical answers as to what friendly or enemy forces will do. Numerical relative-force ratios do not include the human factors of warfare. Many times human factors may be more important than the number of tanks or tubes of artillery. By using historical minimum-planning ratios for various combat missions and carefully considering terrain and enemy templating assumptions, planners can generally conclude what type of operations they can conduct. See Table 1-1. This provides planners with what might be possible, thought not a specific course of action.

FRIENDLY MISSION	FRIENDLY : ENEMY	POSITION
Delay	$\geq 1:3$	None
Defend	$< 1:3$	Prepared or Fortified
Defend	$\leq 1:2$	Hasty
Attack	$\geq 3:1$	Any
Attack	$\geq 6:1$	Any \rightarrow Overrun
Counterattack	$\sim 1:1$	Flank

Table 1-1. Historical minimum planning ratios.

The RCPA has its weaknesses and MSTP will not advocate its unquestioned or isolated adoption. MSTP believes the tool is quite capable in its current form. Further study and fine-tuning will be conducted based on feedback from users. Without a means to measure relative combat power, Marine planners are, at best, flying by the seat of their pants, and at worst flying blind.

1002. Pamphlet Structure

This pamphlet is structured to do the following:

- Define relative combat power and explain the need for a RCPA tool
- Define associated planning terms
- Act as a RCPA user's guide
- Encourage further study and development of RCPA tools or techniques

1003. Intended Audience

The RCPA tool was developed by a School of Advance Warfighting (SAW) student and further fine-tuned by MSTP specifically to provide a quick and easy relative combat power assessment tool to be used by MAGTF and major

subordinate command OPTs during COA development and the COA war game. It should be used to enhance the training and flexibility of students at the Marine Corps University and staff officers from the battalion up to the MEF level.

1004. Other Relative Combat Power Assessment Sources

The following additional sources may be helpful to the MAGTF planner in his understanding of, and solving of, the RCPA problem:

- Joint Technical Coordinating Group for Munitions Effectiveness (JTTCG/ME) for Commander in Chiefs/Department of Defense/Joint Chiefs (CINCs/DOD/JCS); web site is www.amsaa.army.mil/jtcg/jtcg.htm; latest information on Joint Munitions Effectiveness Manuals (JMEMs).
- Army Standard Category Coordinator; web site is www.amso.army.mil; information on attrition and systems data
- Training and Doctrine Command (TRADOC) Analysis Center; web site is leav-www.army.mil; information on both Joint Staff Analysis Model (JSAM) (the current Army program being worked to analysis relative combat power) and Devinci (a more robust tool under development in the Agile Commander Advanced Technology Demonstration)
- National Ground Intelligence Center (NGIC); (703) 604-2453; NGIC has constructed a fairly sophisticated (they admit is somewhat flawed) system called Prototype Readiness Information Support Model (PRISM) for estimating the relative combat power of various countries.
- Proponents for the Navy version are found in the Chief of Naval Operations (CNO) (N-51) office
- Proponents for the Air Force version are found at Doctrine Command at Maxwell Air Force Base

Part II

Relative Combat Power Assessment Tool

The RCPA tool is an EXCEL spreadsheet program designed to facilitate the assessment of relative combat power during the COA development process in the MCPP. It is used as a stand-alone tool by students and OPT planners to compare force ratios and historical planning ratios to determine mission feasibility in training or potential combat environments. The model has inclusive the forces associated with the unclassified Tunisia training scenario. It also includes, in addition to Libyan (LY) enemy forces, generic Iranian (IR), Iraqi (IZ), and North Korean (nK) force models. This guide contains all the information needed to loading and run the RCPA tool.

2001. Loading and Opening the Program

These instructions give a quick overview of how to load and open the RCPA tool. The instructions assume that the user is familiar with the basic techniques of using Windows.

1. Start your computer and start Windows.
2. Insert 3.5 disk labeled RCPA Tool in drive A or B.
3. Double click on My Computer.
4. Double click on 3¹/₂ Floppy (A:) or (B:).
5. Double click on Force Ratio Calculator.
6. The user is now ready to start using the RCPA tool.

2002. Using the Relative Combat Power Assessment Tool

a. Layout

1. The **File** menu (open, close, save, print, and exit) is the only pull down menu used on the Toolbar button.
2. The RCPA spreadsheet overview (see Figure 2-1). The user can find the following list of information displayed on the spreadsheet. The following information will be imputed by the user, selected from a drop down list, or automatically calculated:
 - The number, strength, and type of friendly and enemy forces.
 - Posture of friendly and enemy forces.
 - Terrain occupied by friendly and enemy forces.
 - Water obstacle friendly or enemy forces must cross under fire.
 - Combat effectiveness value (CEV) for friendly and enemy forces.
 - Friendly and enemy relative combat power.
 - Ratios of friendly to enemy and enemy to friendly.
 - Mission of friendly and enemy forces.
 - Estimated losses of friendly and enemy forces.
 - Traffic ability friendly and enemy forces.
 - Advance rate of movement for friendly and enemy forces.
 - Historical minimum planning ratios

Combat Potential Ratios

Friendly Forces					Enemy Forces				
Number	Strength	Type	C.P.	Total	Number	Strength	Type	C.P.	Total
1	100%	Marine Rgt	152	152	1	65%	LY Infantry Bde (BTR)	295	192
1	100%	AAV Bn	150	150	1	63%	LY Infantry Bde (BTR)	295	186
0.33	100%	Tank Bn	640	211		100%		0	0
0.33	100%	LAR Bn	165	54		100%		0	0
	100%		0	0		100%		0	0
	100%		0	0		100%		0	0
	100%		0	0		100%		0	0
	100%		0	0		100%		0	0
	100%		0	0		100%		0	0
	100%		0	0		100%		0	0
	100%		0	0		100%		0	0
Posture		Deliberate Attack		1.30	Posture		Fortified Defense		1.60
Terrain		-		1.00	Terrain		Rolling gentle, bare		1.20
Water Obstacle		Over the Beach		1.00	Water Obstacle		-		1.00
CEV				1.00	CEV				1.00
Friendly Force Combat Potential				744	Enemy Force Combat Potential				734
Ratio of Friendly to Enemy					Ratio of Enemy to Friendly				
1.0:1					1.0:1				
Deliberate Attack			<- Mission ->			Fortified Defense			
27%			<- Est. Losses ->			10%			
Go			<- Trafficability ->			-			
4 Km/day			<- Advance Rate ->			#N/A			

Historical minimum planning ratios		
Friendly mission	Friendly : Enemy	Position required
Delay	$\geq 1 : 3$	None
Defend	$< 1 : 3$	Prepared or fortified
Defend	$\leq 1 : 2$	Hasty
Attack	$\geq 3 : 1$	Any
Attack	$\geq 6 : 1$	Any --> Overrun
Counterattack	$\sim 1 : 1$	Flank

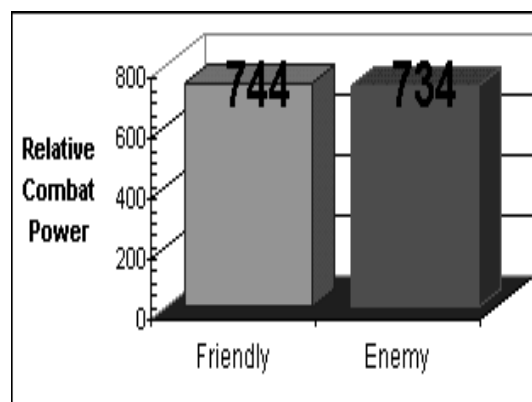


Figure 2-1. Relative combat power assessment spreadsheet.

3. Examples of intangible relative combat power assessments (see Table 2-1) not considered or found on the RCPA spreadsheet.

Factor	Rating	Remarks
Leadership	Good	<ul style="list-style-type: none"> Premiere operational command in the Orangeland army. Senior officers well educated and formally trained in the operational art. Most experienced junior officers and noncommissioned officers assigned to the Northern Operations Group (NOG).
Morale	High	<ul style="list-style-type: none"> Defeated Blueand 313th Brigade. Excellent cohesion and esprit. Well-equipped. Troops have demonstrated discipline in recent intensity engagements.
Training	Marginal	<ul style="list-style-type: none"> NOG usually fights as independent brigades. Not experienced in conducting and controlling multi-brigade combined arms operations. Orangeland pilots do not fly sufficient hours to maintain proficiency.

Table 2-1. Example of intangible relative combat power assessment.

b. Basic Operation

This section explains how to use the various parts of the RCPA tool to compare the force ratios and historical planning ratios to help determine mission feasibility. The planner is trying to gain an understanding of friendly and enemy force strengths and weakness relative to each other by balancing numerical ratios with such things as weather, morale, level of training, and cultural orientation.

- (1) Select type of unit by clicking on row from the shaded light blue **Type** column of either the friendly or enemy forces. See Figure 2-2. Then select type unit from drop down list by clicking in the arrow box. See Figure 2-3. All user input fields are shaded light blue.

Friendly Forces					Enemy Forces				
Number	Strength	Type	C.P.	Total	Number	Strength	Type	C.P.	Total
1	100%	Marine Rgt	152	152	1	65%	LY Infantry Bde (BTR)	295	192
1	100%	AAV Bn	150	150	1	63%	LY Infantry Bde (BTR)	295	186
0.33	100%	Tank Bn	640	211		100%		0	0
0.33	100%	LAR Bn	165	54		100%		0	0
	100%		0	0		100%		0	0

Figure 2-2. Selection of units.

Friendly Forces					Enemy Forces				
Number	Strength	Type	C.P.	Total	Number	Strength	Type	C.P.	Total
1	100%	Marine Rgt	↓	152	1	65%	LY Infantry Bde (BTR)	295	192
1	100%	AAV Bn	Friendly Type Select type of FRIENDLY unit from the list.		1	63%	LY Infantry Bde (BTR)	295	186
0.33	100%	Tank Bn				100%		0	0
0.33	100%	LAR Bn				100%		0	0
	100%		0	0		100%		0	0

Figure 2-3. Selection of units (drop down list).

- (2) Click in the number and strength columns, respectively, of either the friendly or enemy forces, and input the number and strength of unit manually (figure 4b). If less than a whole unit use fractions (e.g. 1 battery = 0.33 battalions). When selecting a battalion task force, consider each company (whether mechanized or armor) as 0.25 of a battalion. So a balanced task force might be 0.5 of a mechanized battalion and 0.5 of an armor battalion. The program will automatically select a combat potential (CP) number for the unit and calculate a total CP based on the number of like units inputted. See Figure 2-4.

Friendly Forces					Enemy Forces				
Number	Strength	Type	C.P.	Total	Number	Strength	Type	C.P.	Total
2	100%	Marine Rgt	152	304	1	65%	LY Infantry Bde (BTR)	295	192
1	63%	LY Infantry Bde (BTR)	295	186					
0.33	100%	LAR Bn	165	54					
	100%		0	0		100%		0	0

Figure 2-4. Inputting numbers and strengths of units.

- (3) Repeat steps (1) and (2) until the user has built both the friendly and enemy forces that he wants to compare. The same process can be used to compare individual engagements of smaller units in a particular movement corridor.
- (4) Select type posture and terrain of forces and any water obstacle the attacker must cross under fire by clicking on row from the shaded light blue **Posture, Terrain, and Water Obstacle** row of either the friendly or enemy forces. See Figure 2-5. Select type posture or terrain of forces or any water obstacle the attacker must cross under fire from drop down list by clicking in the arrow box. See Figure 2-6. The terrain selection for an attacker is always (-) and water obstacle selection for a defender is always (-).

Posture	Deliberate Attack	1.30	Posture	Fortified Defense	1.60
Terrain	-	1.00	Terrain	Rolling gentle, bare	1.20
Water Obstacle	Over the Beach	1.00	Water Obstacle	-	1.00
CEV		1.00	CEV		1.00

Figure 2-5. Selecting posture, terrain, and water obstacle of forces.

Posture	Deliberate Attack	↓	Posture	Fortified Defense	1.60
Terrain	-	↓	Terrain	Rolling gentle, bare	1.20
Water Obstacle	Over the Beach	↓	Water Obstacle	-	1.00
CEV		1.00	CEV		1.00

Figure 2-6. Drop down list for selecting posture, terrain, and water obstacle.

- (5) Click on the shaded light blue box of the Combat Effectiveness Value (CEV) row and input value manually. See Figure 2-7. CEV is used only when the disparity in quality (training, proficiency, leadership, and nationality-specific judgments for quality of general soldiery, tactic, and doctrine) between opponents is so great as to require compensation for effective calculation. The CEV value should range between 1.01 and 3.0 based on historical

performance. Use of CEV should probably be avoided unless absolutely necessary (as when fighting Iraqis). Since this “fudge factor” is such a volatile and influential piece of the puzzle, it should be included only after actual combat experience suggests the level of superiority possessed by one side.

Posture	Deliberate Attack	1.30	Posture	Fortified Defense	1.60
Terrain	-	1.00	Terrain	Rolling gentle, bare	1.20
Water Obstacle	Over the top	1.00	Water Obstacle	-	1.00
CEV	Input the CEV manually.	1.00	CEV		1.00

Figure 2-7. Inputting combat effectiveness value.

- (6) The program calculates or inserts the remaining information. See Figure 2-8. The user is provided ratios for friendly to enemy force capabilities and enemy to friendly force capabilities. The user also is provided with information on estimates of losses, trafficability, and advance rate of movement for both friendly and enemy forces. The planner can determine mission feasibility from force ratios and historical planning ratios comparison and by comparing the relative combat power of the friendly and enemy forces. The relative combat power is displayed as a bar chart with a numerical number. The historical minimum planning ratios are found in the table to the left of the relative combat power bar chart.

Friendly Force Combat Potential 941		Enemy Force Combat Potential 734	
Ratio of Friendly to Enemy 1.3:1		Ratio of Enemy to Friendly 0.8:1	
Deliberate Attack	<- Mission ->	Fortified Defense	
26%	<- Est. Losses ->	11%	
Go	<- Trafficability ->	-	
4 Km/day	<- Advance Rate ->	#N/A	

Historical minimum planning ratios		
<i>Friendly mission</i>	<i>Friendly : Enemy</i>	<i>Position required</i>
Delay	$\geq 1 : 3$	None
Defend	$< 1 : 3$	Prepared or fortified
Defend	$\leq 1 : 2$	Hasty
Attack	$\geq 3 : 1$	Any
Attack	$\geq 6 : 1$	Any --> Overrun
Counterattack	$\sim 1 : 1$	Flank

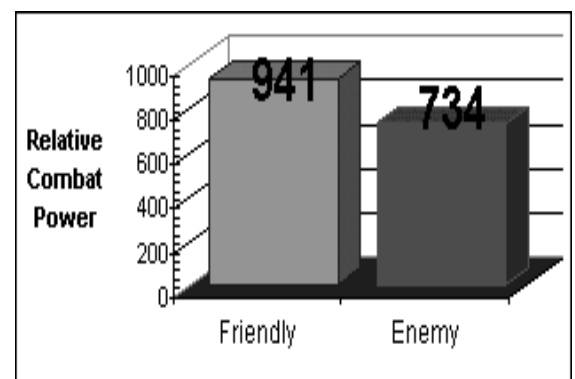


Figure 2-8. Force ratios and historical planning ratios.

Note 1: Advance rates are *automatically calibrated* for Armor/Mechanized units. For infantry units, multiply advance rates found in the Advance Rate row (figure 7) by .33 for “Go” terrain, .5 for “Slow Go” and .67 for “No Go.” The “Go, Slow Go, and No Go” values are found in **Trafficability** row. See Figure 2-9. Force ratios greater than 6:1 will yield advance rates for unopposed movement and the planner should consider the enemy unit overrun and destroyed.

Deliberate Attack	<- Mission ->	Fortified Defense
27%	<- Est. Losses ->	For infantry units multiply advance rates by: 0.33 for "Go" 0.5 for "Slow Go" 0.67 for "No Go"
Go	<- Trafficability ->	
4 Km/day	<- Advance Rate ->	

Figure 2-9. Advance rates and trafficability.

Note 2: When armored/mechanized units fight in terrain that is unfavorable to them (i.e., Urban or No Go terrain), use the comparable units labeled “unfavorable terrain” (Figure 2-3) to capture their relative disadvantage in combat power.

Remember: Relative force ratios do not necessarily indicate the chance for success of either force.

(7) To leave the RCPA tool, choose **File** then **Exit**. To save results, save file as, and name the file.

2003. Tutorial

Planners develop COAs based on a mission, enemy, terrain, and weather, troops and support available – time available (METT-T) analysis, threat versus friendly capability assessment, and a determination of possible employment options. Using at least the required inputs (mission statement, commander’s intent, and commander’s planning guidance), planners consider two fundamental questions—

- What do we want to do?
- How do we want to do it?

Answering the question “how do we want to do it?” is the essence of COA development. The OPT must first focus on the enemy. Then it reviews the friendly situation—how to array the friendly forces based on current and projected locations. With this done, the OPT looks at relative combat power and assesses the relative strengths, weaknesses, and capabilities of friendly forces to enemy forces. This tutorial leads the user through a short exercise in the use of the RCPA tool as a technique to assess relative combat power during COA development. Before starting, the user should have a working understanding of paragraph 2002.

In this scenario, the OPT will assess a Marine task force with a Marine regiment (-)(rein), with two tank companies, two AAV companies, one LAR battalion, one M-198 artillery battalion supported by twelve F-18 sorties, and sixteen AV-8B sorties in a deliberate attack against a notional Libyan motorized infantry brigade, a T-62 tank battalion, and one independent artillery regiment in a hasty defense.

- The user’s first step is to load and open the RCPA program [paragraph 2001].
- The next step is to input the type, number, and strength of all units for both the friendly and enemy forces [paragraphs 2002b(1) through (3)].
- Then select the type posture and terrain of forces and any water obstacle the attacker must cross under fire [paragraph 2002b(4)]. In this scenario, the attacker is not crossing a water obstacle under fire, so the user will select (-) for the friendly force.
- In the next step, the planner decides that the disparity in quality between the friendly and enemy forces is not so great as to require compensation for effective calculation, so he assigns a CEV of 1 for both forces [paragraph 2002b(5)].
- The RCPA tool automatically calculates or inserts the remaining information needed by the planner to assess relative combat power of the friendly and enemy forces [paragraph 2002b(6)].

According to the information calculated by the RCPA tool (see Figure 2-10), success in this case by the friendly forces was unlikely. The posture for the friendly forces is attacking, and by comparing historical minimum planning ratios for an attacking force to the ratio produced by the RCPA tool of friendly to enemy, the planner can see that he does not have the right force mix or capability for the 3:1 ratio that history predicts is required to most likely yield success. Based on the estimated losses and the ratio of friendly to enemy, the advanced rate value is open to interpretation. The moderate casualty rate coupled with the low predicted movement rate and force ratio may be predicting a stalled or very difficult attack. Interpretation remains in the hands of the user and should be balanced against recent history and METT-T.

Combat Potential Ratios

Friendly Forces					Enemy Forces				
Number	Strength	Type	C.P.	Total	Number	Strength	Type	C.P.	Total
0.66	100%	Marine Rgt	152	100	1	80%	LY Infantry Bde (BTR)	295	236
0.5	100%	Tank Bn	640	320	1	65%	LY T-62 Bn	240	156
1	100%	LAR Bn	165	165	1	70%	LY Corps Artillery	290	203
0.5	100%	AAV Bn	150	75		100%		0	0
1	100%	M-198 Bn	40	40		100%		0	0
12	100%	F-18 Sortie	14	168		100%		0	0
16	100%	AV-8B Sortie	6	96		100%		0	0
	100%		0	0		100%		0	0
Posture		Deliberate Attack		1.30	Posture		Hasty Defense		1.30
Terrain		-		1.00	Terrain		Flat, bare, hard		1.05
Water Obstacle		Over the Beach		1.00	Water Obstacle		-		1.00
CEV				1.00	CEV				1.00
Friendly Force Combat Potential				1259	Enemy Force Combat Potential				818
Ratio of Friendly to Enemy					Ratio of Enemy to Friendly				
1.5:1					0.6:1				
Deliberate Attack			<- Mission ->			Hasty Defense			
12%			<- Est. Losses ->			16%			
Go			<- Trafficability ->			-			
4 Km/day			<- Advance Rate ->			#N/A			

Historical minimum planning ratios		
Friendly mission	Friendly : Enemy	Position required
Delay	$\geq 1 : 3$	None
Defend	$< 1 : 3$	Prepared or fortified
Defend	$\leq 1 : 2$	Hasty
Attack	$\geq 3 : 1$	Any
Attack	$\geq 6 : 1$	Any --> Overrun
Counterattack	$\sim 1 : 1$	Flank

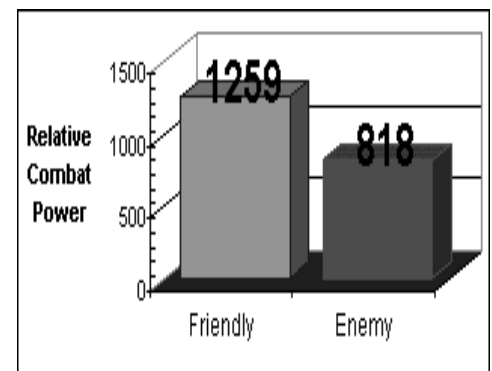


Figure 2-10. Relative combat power assessment results for tutorial scenario.

The RCPA tool provides the planner with a quick way to calculate relative combat power, but the bottom line is that **relative-force ratios do not necessarily indicate the chance for success**. Do not forget about the intangibles when considering relative combat power [paragraph 2001a(3)]. They alone may drive decision-makers to decide to go forward with this proposed operation, in spite of this tool's computed relative combat power ratio.

2004. Reference Guide and Tips

Advance Rates. Based on FM-130, *Intelligence Preparation of the Battlefield*, "Opposed Rates of Advance Tables" and reproduced in MSPT Pamphlet 5-0.3, *MAGTF Planner's Reference Manual*.

Center of Gravity. COG is those characteristics, capabilities, or localities from which a military force derives its freedom of action, physical strength, or will to fight. At the tactical level, if the enemy COG does not prevent you from achieving your purpose, then it may not be a COG. Remain focused on the purpose. The attack of the enemy COG through his CVs is only important if it leads you to the accomplishment of your purpose.

Course of Action. 1. A plan that would accomplish, or is related to, the accomplishment of a mission. 2. The scheme adopted to accomplish a task or mission. It is a product of the Joint Operation Planning and Execution System concept development phase. The supported commander will include a recommended COA in the commander's estimate. The recommended COA will include the concept of operations, evaluation of supportability estimates of supporting organizations, and an integrated time-phased data base of combat, combat support, and combat service support forces and sustainment. Refinement of this database will be contingent on the time available for COA development. When approved, the COA becomes the basis for the development of an operation plan or operation order.

COA Development. Commander issues planning guidance with respect to COA development, and for decisive, shaping, and sustaining actions. Review modified combined obstacle overlays, doctrinal and situation templates, and enemy COA models. Graphically array friendly and enemy forces. **Develop the relative combat power assessment.** Develop initial COAs by working backward from the purpose of the operation, the end state conditions that achieve the purpose, enemy COG/CV, to decisive, shaping and sustaining actions and reserves. Consider type of offensive operations and forms of maneuver that can lead you to a decision. Think time and space at the MEF level—deep, close, rear operations. Determine which forms of maneuver best exploit the combined arms of the MAGTF across the entire battle space. Where do you want to force, accept, or refuse battle? Review the commander's planning guidance against the COA. Ensure that the COA is **Suitable** (accomplishes the mission [purpose] and complies with the commander's guidance). **Feasible** (accomplish mission with available time, space, and **resources**). **Acceptable** (accomplish an advantage that **justifies the cost in resources**). **Distinguishable** (significantly different from other COAs in forms of maneuver or attacking enemy COG through CVs). **Complete** (accomplish all the tasks in accordance with the commander's guidance). Brief the initial COAs to the commander.

Commander's Intent. Purpose, method, and end state.

Critical Vulnerability. An aspect of a center of gravity that if exploited will do the most significant damage to an adversary's ability to resist. A vulnerability cannot be critical unless it undermines a key strength.

Estimated Losses. Based on T. N. Dupuy, *Attrition: Forecasting Battle Casualties and Equipment Losses in Modern War*.

Operational Planning Team. A group built around the future operations section, which integrates the staff representatives and resources. The OPT may have representatives or augmentation from each of the standard staff sections, the six warfighting functions, staff liaisons, and/or subject matter experts.

Task Force. A temporary grouping of forces designed to accomplish a particular mission. Task organization involves the distribution of available assets to subordinate headquarters by attachment or by command relationships such as operational control, tactical control, and supporting roles.

Wargaming Tip. While wargaming, save a separate sheet for each engagement (Edit->Move or Copy Sheet->check the “Copy” box). Change the name of the tab to the name of the engagement (e.g., “Main Battle Area” or “Counter Reconnaissance Battle”). Do the calculation and print out the sheet. The printout will have the name of the sheet (engagement) and you can post it, with the bar graph and damage estimates to refer to later. This allows the planner to go back and reanalyze each engagement later.

Use of Air Sorties. This RCPA tool makes the assumption that air superiority has been obtained by the friendly forces before ground forces are committed. Therefore, friendly and enemy air comparisons are not reflected in this model. Take into account that this assumption could change and the planner would need to make an assessment of both friendly and enemy aviation. The CP of friendly air sorties is based on historical performance in the close air support role. Do not attempt to engage with only air units on one side as this will lead to unbalanced results.

Caution in Use of RCPA Tool. The CP Ratios is the only spreadsheet that should be used by the user. The data and tables spreadsheets are data tables linked to RCPA tool and supports the CP ratios spreadsheet. Make changes to data and tables spreadsheets only if you are a very experienced EXCEL user and understand the links between all the tables.

Credits. Original concept: Major J. Craig, CGSC, 2000. As modified by: Mr. W. A. Sayers, SAW, 2000 and MSTP, September 2001.

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Appendix A

Glossary

Note: Acronyms change over time in response to new operational concepts, capabilities, doctrinal changes and other similar developments. The following publications are the sole authoritative sources for official military acronyms:

1. Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*.
 2. MCRP 5-12C, *Marine Corps Supplement to the Department of Defense Dictionary of Military and Associated Terms*.
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CEV	combat effectiveness value
CINC	commander in chief
CNO	Chief of Naval Operations
COA	course of action
COG	center of gravity
CP	combat potential
CV	critical vulnerability
DOD	Department of Defense
IPB	intelligence preparation of the battlespace
JCS	Joint Chiefs of Staff
JMEM	Joint Munitions Effectiveness Manual
JSAM	Joint Staff Analysis Model
JTCG/ME	Joint Technical Coordinating Group for Munitions Effectiveness
MAGTF	Marine air-ground task force
MCDP	Marine Corps doctrinal publication
MCWP	Marine Corps warfighting publication
MCPP	Marine Corps Planning Process
MEF	Marine expeditionary force
METT-Tmission,	enemy, terrain, and weather, troops and support
	available – time available
MSTP	Marine Air-Ground Task Force Staff Training Program
NGIC	National Ground Intelligence Center
OPT	operational planning team
PRISM	Prototype Readiness Information Support Model
RCPA	relative combat power assessment

SAW

School of Advance Warfighting

TRADOC

Training and Doctrine Command